

HOUSEHOLD AND STORED PRODUCTS HOUSEHOLD AND STRUCTURAL INSECT CONTROL

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Document Pest Identification and Habits

It is important that pests be accurately identified. An Extension Specialist's recommendation(s) for chemical and non-chemical pest control are largely dependent on the pest's identification and a full description of the circumstances surrounding its collection and appearance--i.e., its habits, food, description, where it was found, and what it was found infesting (if anything). In some cases, the chemical control of pests is not needed, and indeed of no use. In other cases, only the use of pesticides will solve the problem. Many cases, however, require a combination of both chemical and non-chemical control techniques.

Contact a local county Extension Service agent for help in identifying specimens. An Extension agent can identify samples by visual observation or by looking at a photograph. If the homeowner has access to a digital camera, a photograph(s) can be taken and emailed to the Extension Service for immediate identification. Specimens can also be collected, placed in a leak-proof vial filled with rubbing alcohol, and mailed to the nearest county Extension Service office.

Hiring a Professional Pest Control Company

It is often best to hire a professional pest control company to tackle pest control problems. It is especially important to select a company committed to customer service, especially if the homeowner is considering entering a long-term service contract. Some tips on hiring a pest control company include:

- Ask friends, neighbors, and co-workers about their experiences and interactions with pest control companies. Selecting a professional pest control company is not unlike selecting other service providers, such as electricians and plumbers. Consistently good recommendations are still the most reliable means of selecting a quality pest control professional.
- Avoid going to the yellow pages and selecting a company based solely on an advertisement. Furthermore, do not hire a pest control company based on treatment price alone. A variety of factors should be considered when making a decision on which company to hire.
- Contact the appropriate state regulatory agency to ensure that prospective companies are licensed. In Georgia, the Department of Agriculture (www.agr.state.ga.us) is the agency that regulates the pest control industry.
- Ask prospective companies to describe their commitment to the continuing education of their pest control technicians. Although all technicians in Georgia are required to attend State-approved continuing education seminars, some companies provide in-house training or send their employees to University- or State-sponsored training programs and workshops that are above and beyond that required by the State.
- Ask prospective companies whether they are a member of their state and/or national pest control organization(s). Membership in these organizations suggests that the firm is well-established, and that the owners are active in their profession. Membership also suggests that owners and managers attend national and state conferences where insight into key issues facing the pest control industry are highlighted and discussed, and the most recent findings on pest control research and application technology are presented.

Homeowners and Termite Control

Homeowners should not attempt to treat their home for an existing termite infestation. The treatment techniques, products, and equipment needed to rid a home of termites are available only by hiring a professional. The most important challenge confronting anyone attempting to control termites lies in locating and properly treating the area(s) where termites are entering the structure. This goal can best be accomplished by a professional. To learn more about subterranean termites and their control see Georgia Cooperative Extension Service publications at <http://www.ent.uga.edu/pubs.htm>.

Where to Treat

Before selecting chemically-based pest control measures (see Table below), a thorough **inspection** of the outdoor and/or indoor premises should be conducted to determine the extent of the infestation and to highlight those areas where control approaches should be focused. Many indoor infestations of urban pests can be tracked to areas of pest activity (harborage) on the outside of the structure, while still other pests are found only indoors.

Moisture Management

The most important condition conducive to pest infestation in and around the home is **excessive moisture**. Since all life forms are dependent upon moisture, its excess not only attracts pests but allows them to thrive. Some common sources of excessive moisture in and around homes include improper grade/drainage; standing water in the crawlspace; broken drainpipes; roof leaks; interior plumbing leaks; improperly installed flashing around fireplaces, windows and doors; improper ventilation in the crawlspace; lack of a vapor barrier in the crawlspace; misdirected sprinklers; clogged gutters and downspouts; and downspout exhaust within 5 feet of the structure.

The property owner should ensure that water flows away from structure (i.e., grade is appropriate and gutters and downspouts are operating properly), that the structure is properly ventilated, that water leaks are fixed in a timely manner, and that a vapor barrier is in place in the crawlspace. Homeowners should keep groundcovers, shrubs, vines, and mulch several feet away from outside foundation walls as these horticultural practices often hold excessive moisture close to the structure. For instance, **mulch** retains moisture in the soil, thereby creating a zone that provides conditions (high moisture) urban pests need to explore and thrive in an area. Although no scientific data specifically addresses the affect that mulch has on pest infestation rates, it is known that mulch placed against a structure's outside walls allows pests easy access.

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How to Use Various Product Types

Bait Products. Over-the-counter bait products are generally limited to ant, cockroach, rat, and mouse control, and can be used both inside and outside the home. Baits are available in the form of **gels/pastes, granules, liquids, stations, or blocks**, and most come ready-to-use.

Baits are products that kill pests only after being consumed. As such, they are comprised of a toxicant (i.e., active ingredient) incorporated into a food source (i.e., the bait material) that is both palatable and preferred by the target species. Since baits contain food materials, they are susceptible to spoilage; read the product's label to determine if the bait has an expiration date. Baits are target-specific, and thus considered more environmentally-sensitive, than the other chemically-based control tactics discussed hereafter.

When **baiting for ants**, a few recommendations should be followed. First, place baits where ants are seen foraging (inside and/or outside structures) and if possible always in the shade when baiting outdoors. Ants do not forage in the direct sun or during the heat of the day, but may be found foraging in the same area in shaded locations. Second, it is often advantageous to purchase and use, at the same time, several different baits to discover one that ants will readily consume since no single bait is consistently eaten by all ant species. Control of ants with bait products can only be achieved if they consume the bait. Third, baiting species whose colonies are comprised of a large number of ants (such as Argentine ants) requires that a large quantity of bait be offered. In these cases, it is advantageous to place a large number of baits or bait placements (at least several dozen), no matter the type of bait used, throughout the area(s) where ants are seen. Fourth, when using granular baits (use them only outdoors), they should be delivered from a number of small piles (about the size of a quarter) placed on the ground in areas where ants have been seen. Finally, during drought or extended periods of moisture stress liquid baits (use them inside and outside) may be used to take advantage of the ants' natural propensity for sweet liquids. To use liquid baits, completely soak a small cotton ball with liquid bait and place it on a piece of foil or wax paper in areas where ants have been seen. As the liquid bait evaporates from the cotton ball (1-2 days), simply add water to 'recharge' the liquid bait.

When **baiting for cockroaches** use gel/paste baits and/or bait stations and when treating for rats and mice use block and/or throw packages of bait granules. Indoors (i.e., for German cockroaches), use a combination of **sticky traps** (no toxicant) and gel/paste baits and/or bait stations placed throughout each room where German cockroaches are found. German cockroaches are most common in the kitchen, where 12-15 strategically-placed bait stations may be needed in cases of severe infestation. Additionally, gel/paste bait may be used by placing small 'dabs' (each about the size of pencil eraser) in hidden locations (up to 2-3 dozen sites per baiting). Each dab should be placed in an out of sight crack, crevice, or corner where cockroaches live. Whether using gel/paste bait and/or bait stations, it is often advantageous to introduce a large number of bait placements throughout the baited room since cockroaches generally do not move far from the area(s) where they live.

Place baits on flat surfaces in dark locations in corners (e.g., in cabinets and drawers) and along walls. Since research shows that most German cockroaches are found near the garbage can, refrigerator, and under the stove and sink, concentrate bait placement in these areas. Never hang stations vertically or otherwise bait vertically, and never place baits in the middle of a floor or cabinet---i.e., away from a corner or wall.

Sticky traps (10-12) can be placed in locations similar to that of baits, checked weekly for the presence of cockroaches, and replaced as needed. Since German cockroaches do not move far, traps that consistently catch the largest number of cockroaches often highlight 'focal points' of cockroach infestation.

For large cockroach species (i.e., not German cockroaches) use mainly gel/paste baits. Place bait wherever cockroaches are seen foraging, particularly at night. The breeding site of large cockroach species are those locations characterized by a protected, moist environment---typically crawlspaces or attics with a moisture problem, or outdoors in clogged rain gutters, treeholes, decorative crossties, hollow retaining walls, and similarly protected habitats. Concentrate gel/paste baiting in these areas. Again, it is most advantageous to introduce a large number of small bait placements since cockroaches generally do not move very far from the area(s) where they live.

Granular Products. Granulars are formed by impregnating or coating insecticide onto a small granule of non-active carrier (e.g., clay, corncob, sand, silica, clay, sawdust, etc.). Granules are applied only on the outside, and are used to control a wide variety of crawling pests by application to places pests live---that is mulch, leaf litter, lawn, etc. Granular products are sometimes purchased in large bags (pounds) as a ready-to-use product.

After application, the insecticide must be released from the granule by allowing water to wash over it. Thus, granular 'activation' requires lawn-watering or natural rain. Unlike liquid sprays (discussed below), granular products may remain active for as long as six to eight weeks. Like liquid sprays, granular products act by contact (killing) and by keeping foraging pests out of treated areas (repellency).

Granular products exhibit one distinct advantage over other formulation types---their weight. The weight of the granule allows the chemical to reach deeper into treated areas than would be expected from a liquid spray treatment (discussed below) applied directly to the surface of the same substrate. *It is important to note that pests do not eat granular products, as they do some baits that are delivered as small granules. In fact, a granular product is never a bait, but bait can be delivered in the form of a granule.*

Dust Products. Dust products have the consistency, look and feel of powder and are purchased ready-to-use. They are not mixed with water, and are applied dry. Dusts are comprised of small particles of active ingredient mixed with equivalently small particles of an inactive carrier material such as talc or clay. Most dusts work because insects pick up the minute particles and ingest them, while others severely desiccate the insect, causing it to dehydrate and die.

Generally, dusts should be used only in dry voids such as behind brick veneer, drywall, electrical switch-plates, and synthetic stucco to remedy existing pest problems indoors and to prevent the reinvasion of pests into voids from the outside. For example, if ants can be seen coming from an electrical switch-plate a small quantity of dust can be applied behind the plate.

Many homeowners make the mistake of over-applying dust. Too much can be repellent, causing insects to avoid dusted areas. Apply dusts so that a very thin film settles in treated voids and on treated surfaces. Ideally, the quantity of dust applied should be only slightly visible in comparison to undusted areas. Some dusts never degrade, while others remain effective for up to a year.

Some dusts contain a high concentration of active ingredient, and should never be applied where or when they can injure or sicken non-target organisms---including the applicator. Misapplication of dusts can result in accidental inhalation and thus unnecessary exposure. Since dusts become airborne very easily, it is advisable to always wear a protective mask and preferably eye protection when applying them.

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Aerosol and Fogger Products. The contents of **aerosol** cans and total release aerosol **foggers** are pressurized, usually contain a propellant and the pesticide(s), and emerge as a fine mist or smoke (i.e., microscopic droplets). Aerosol cans are very popular among homeowners because they result in 'revenge' killing---i.e., direct spraying and immediate knock down and kill of the target pest. Although aerosol cans may be effective in the short-term, they should not be relied upon as the sole means of chemical pest control in and around the home.

Some aerosol cans shoot their contents in a jet stream, and are a good choice when there is a need to treat pests from a distance (e.g., yellow jackets). Although aerosol cans may be used both indoors and outdoors, the use of foggers is restricted to indoor use especially when treatment requires that a room be filled with pesticide for an extended period of time.

If aerosols are used indoors, never use them in voids or near fires. Wet formulations not only damage drywall, insulation, and wood molding but there is a danger of electrical shock and/or fire when using liquids around electricity. Furthermore, many aerosols and foggers are flammable.

Liquid Spray Products. Liquid spray products most commonly available to homeowners are **emulsifiable concentrates (ECs)**. Emulsifiable concentrates are available as **concentrates** (these products must be diluted with water before use) and **ready-to-use (RTU)** products (these products are usable without further dilution., and usually come in 1 gallon jugs).

Emulsifiable concentrates are composed of an insecticide dissolved in a petroleum-based solvent which, when mixed with water, forms a milky-white emulsion that can be sprayed. Emulsifiable concentrates do not require agitation (shaking). The main hazard with undiluted emulsifiable concentrates is that they are readily absorbed should the material come in contact with unprotected skin. They do, however, protect against inhalation hazard. Emulsifiable concentrates are readily absorbed by porous materials, making them fairly unsuitable for treating concrete, brick, unpainted wood, mulch, and other porous substrates.

Liquid spray treatments are commonly applied to the outside of infested homes in either of two ways. To conduct a **perimeter treatment** spray the outside walls two to three feet high and spray the ground (including shrubbery, mulch, flower beds, etc.) for three to five feet away from each wall around the entire perimeter of the home. Spray as many areas where pests live or are traveled or potentially traveled as possible. Concentrate spray treatments to areas where pests might enter the structure, such as around doors and windows, inside weep holes, and inside wall penetrations such as gas, plumbing, and exhaust pipes. Perimeter treatments should be re-applied every four to six weeks during the summer and within a week following a heavy rain. Perimeter treatments may require up to 10 gallons of spray, depending on the size of the structure treated.

Spot treatments are limited to those areas where pests are found living and breeding. Typically, no one spot requires more than a quart or so of spray---sometimes less, depending ultimately on the severity of the pest infestation. When spot treating, only those areas considered nests and/or breeding sites or areas where pests are found entering the structure are treated. Breeding sites should be exposed prior to treatment. For example, exposure of breeding sites in mulch can be accomplished by pulling back the mulch with a stiff rake or similar instrument held in one hand while treating exposed nest sites with the other.

Unfortunately, research has shown that liquid-based spray treatments applied outdoors provide only temporary relief (about 30 days) against invading pests. Many sprays break down quickly when exposed to intense sunlight, heat, and moisture---dominant outdoor conditions when pest infestations are greatest.

How to Use This Table

Use of the following table is based on proper identification of the pest---see section above, *Document Pest Identification and Habits*. Once the pest has been identified, locate its name in the table. The table provides a list of product types and names available to homeowners at home improvement, grocery, and consumer warehouses. For additional help, the above section, *How to Use Various Product Types*, provides tips and recommendations on how to use the various products listed in the table. Additional information on urban and structural pest biology and control can be found at <http://www.ent.uga.edu/pubs.htm>.

PEST	PRODUCT TYPE	PRODUCT NAME	% ACTIVE INGREDIENT
<p>Ants (including Argentine [i.e., "sugar" ants] & odorous house ants) First, bait both indoors and outdoors at the same time if ants are found in both areas. Often, indoor ant problems originate outdoors. Indoors, bait wherever ants are seen with bait gel, liquid, and stations. Do not use Bait granules, sprays, or granulars indoors. If ants are found outdoors, use baits wherever ants are seen (especially next to trails). Use all types of bait products listed. Second, if baiting is not successful (give it one week), apply a perimeter spray and/or spot-treat outdoors only (i.e., windows, doors, nest sites). In addition, apply a granular to soil/mulch where ants nest. TIP: The application of many small bait spots is preferred to the application of a few large bait spots. If feasible, apply baits in shaded areas. TIP: After applications of granulars, water thoroughly.</p>	Bait Gel	Combat Ant Killing Gel	0.001% fipronil
	Bait Granules	Amdro Ant Block Home Perimeter Ant Bait	0.88% hydramethylnon
	Bait Liquid	Terro The Liquid Ant Killer	5.4% Borax
		Spectracide Bug Stop Liquid Ant Bait	0.05% dinotefuran
		Hot Shot Ultra Liquid Ant Bait	0.05% dinotefuran
	Bait Station	Combat Quick Kill Formula-Ants	0.01% fipronil
		MaxAttrax Ant Bait	0.05% indoxacarb
		Grants Kills Ants	1% hydramethylnon
		Real Kill Ant Bait	0.04% indoxacarb
		Raid Ant Baits III	0.01% avermectin B1
Raid Double Control Ant Baits		0.05% avermectin B1	
Spectracide Ant Shield Outdoor Killing Stakes		0.05% indoxacarb	
Raid Outdoor Ant Spikes	0.05% avermectin B1		

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PEST	PRODUCT TYPE	PRODUCT NAME	% ACTIVE INGREDIENT
Ants (including Argentine [i.e., "sugar" ants] & odorous house ants) (continued)	Sprays	Any ready-to-use or concentrated liquid spray labeled for this pest(s).	Various
	Granular	Any granular product labeled for this pest(s). Greenlight Yard Safe Insect Repellent Granules	Various 2% cedar oil
Bedbugs Capture several bugs, place them in a vial filled with alcohol, and acquire positive identification from an entomologist. If a positive ID is made, contact a pest control professional skilled and experienced in the treatment and elimination of bedbug infestations. Bedbug elimination is very difficult, and should be left to an experienced individual. For more information: See publication, <i>Bed Bugs</i> , at http://www.uky.edu/Agriculture/Entomology/entfacts/struct/ef636.htm	None	None	None
Booklice (Psocids) <u>Indoors:</u> The presence of booklice is an indication of excessive moisture. Psocids feed on fungi, which grow on substrates such as books, paper, and cardboard. Fungi thrive only in environments where humidity is excessive. As a result, the ultimate remedy to infestation is a reduction in humidity (see section above on Moisture Management). <u>Outdoors:</u> No treatment needed.	None	None	None
Carpenter Ants <u>Indoors:</u> At night, when ants are most active, provide them bait. Use any of the gel, liquid, or station baits listed until one is found that the ants will consume. <u>Outdoors:</u> Find nest(s) at night—look for trails of big, black ants, especially on the trunk of large trees. If nest(s) are found (they'll most likely be in trees), drench with a liquid spray if feasible. If nest(s) are not found or treatment is not feasible, at night (when ants are most active) provide them any of the baits listed until one is found that the ants will consume. Place bait next to ant trails. For more information: See publication, <i>Biology and Management of Carpenter Ants</i> , at http://www.ent.uga.edu/pubs.htm	Bait Gel	Combat Ant Killing Gel	0.001% fipronil
	Bait Granules	Amdro Ant Block Home Perimeter Ant Bait	0.88% hydramethylnon
	Bait Liquid	Terro The Liquid Ant Killer	5.4% borax
	Bait Station	Raid Double Control Ant Baits Combat Quick Kill Formula-Ants	0.05% avermectin B1 0.01% fipronil
	Sprays	Any ready-to-use or concentrated liquid spray labeled for this pest(s).	Various

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PEST	PRODUCT TYPE	PRODUCT NAME	% ACTIVE INGREDIENT
<p>Carpenter Bees</p> <p><u>Indoors:</u> No treatment needed.</p> <p><u>Outdoors:</u> Apply spray or jet aerosol directly into carpenter bee holes. Begin treatment when bees are first seen (April in Georgia). Re-treat every two weeks while bees are active. In August (when all bees have left their nest sites), fill holes with wood filler, sand, and paint (or apply another finish); replace damaged wood as necessary.</p> <p>NOTE: Pesticides are extremely toxic to all types of bees.</p>	Sprays	Any ready-to-use or concentrated liquid spray labeled for this pest(s).	Various
	Jet Aerosol	Any jet-spray aerosol product that shoots 20-25 feet.	Various
<p>Carpet Beetles</p> <p><u>Indoors:</u> Find infested article(s) and remove; spot-treat infested area (especially the floor) with a spray while freezing or fumigating article(s); return article(s) and watch for re-infestation.</p> <p><u>Outdoors:</u> No treatment needed.</p>	Sprays	Any ready-to-use or concentrated liquid spray labeled for this pest(s).	Various
<p>Cockroaches</p> <p><u>Indoors</u> (German cockroaches): Use gel baits, bait stations, and sticky traps in areas (mainly kitchen) where German cockroaches are found. In cases of extreme infestation, use a fogger or spray into cracks and crevices where cockroaches live. For details, read section baiting for cockroaches under the heading How to Use Various Product Types (above).</p> <p><u>Outdoors</u> (Smokybrown cockroaches): Use gel baits in areas where cockroaches are found (attics, crawlspaces, treeholes, hollow walls, and other voids outdoors). If bait's not effective, spot-treat same areas with a spray. For details, read section baiting for cockroaches under the heading How to Use Various Product Types (above). If smokybrown cockroach populations are found in the attic and/or wall voids, apply a fine mist of diatomaceous earth dust into these areas. Do Not apply dust where it can be contacted by humans.</p> <p>TIP: When using gel baits, the application of many small bait spots is preferred to the application of a few large bait spots.</p>	Bait Gel	Combat Platinum Roach Killing Gel Hot Shot Ultra Clear Roach gel	0.01% fipronil 0.05% dinotefuran
	Bait Liquid	Hot Shot Ultra Liquid Roach Bait	0.05% dinotefuran
	Bait Station	Combat Quick Kill Formula-Roaches Hot Shot Nest Destroyer Roach Bait Raid Max Double Control Raid Double Control Small Roach Baits Plus Egg Stopper (for German cockroaches only)	0.03% fipronil 0.10% indoxacarb 0.05% avermectin B1 0.05% avermectin B1 95% hydroprene
	Spray	Any ready-to-use or concentrated liquid spray labeled for this pest(s). Bengal Gold Roach Spray (aerosol can)	Various 2% permethrin 0.05% pyriproxyfen
	Fogger	Raid Fumigator	12.6% permethrin
	Dust	Diatomeceous Earth	77.69% silicon dioxide from DE

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PEST	PRODUCT TYPE	PRODUCT NAME	% ACTIVE INGREDIENT
<p>Fire Ants</p> <p><u>Indoors:</u> No treatment needed.</p> <p><u>Outdoors:</u> Spread bait granules in late afternoon (when temperatures have cooled and the ground is dry) to entire yard or sprinkle one handful around (not on top of) the perimeter of each active mound; 10-14 days later, if active mounds remain either (1) apply granular to entire yard, or (2) treat individual mounds with dust.</p> <p>For more information: See publication, <i>Managing Imported Fire Ants in Urban Areas</i>, at http://www.ent.uga.edu/pubs.htm</p> <p>TIP: After applications of granulars, water thoroughly.</p>	Bait Granules	Safer Brand Fire Ant Killer	0.015% spinosad
		Garden Safe Fire Ant Killer	0.015% spinosad
		Amdro Fire Strike (grey jug)	0.315% hydramethylnon 0.25% methoprene
		Amdro Fire Strike (bag)	0.036% hydramethylnon 0.0172% methoprene
	Dust	Once & Done (red bag or grey jug)	0.016% indoxacarb
		Over- N -Out Fire Ant Killer Mound Treatment (blue jug)	0.008% indoxacarb
<p>Fleas</p> <p><u>Indoors:</u> Spray or fog small areas or rooms where pets spend the most time. Use products containing pyriproxyfen or methoprene. Concurrently, treat animal(s) with one product containing either lufenuron or imidacloprid or fipronil. Keep pet resting areas clean.</p> <p><u>Outdoors:</u> Concurrent with the above actions, spot-treat infested areas with spray or apply granulars to areas where pets spend the most time.</p> <p>For more information: See publication, <i>Fleas and the PCO</i>, at http://www.ent.uga.edu/pubs.htm</p> <p>TIP: After applications of granulars, water thoroughly.</p>	Sprays	Orthene Fire Ant Killer	50% acephate
	Granular	Over-N-Out Fire Ant Killer Granules (blue bag)	0.0103% fipronil
	Sprays	Any ready-to-use or concentrated liquid spray labeled for this pest(s).	Various
	Aerosol can	Bengal Full Season Flea Killer Plus	0.015% pyriproxyfen 0.40% tetramethrin 0.30% sumithrin
		Raid Flea Killer Plus Carpet and Room Spray (purple can)	0.14% pyrethrins 0.063% tetramethrin 0.015% methoprene
	Fogger	Real-Kill Indoor Flea Fogger	0.10% pyriproxyfen; 0.05% pyrethrins; 0.40% permethrin
		Raid Flea Killer Plus Fogger	0.50% pyrethrins 0.075% methoprene
	Food Additive	Program	lufenuron
Granular	Any granular product labeled for this pest(s).	Various	
<p>Flies</p> <p><u>Indoors:</u> Find fly breeding site(s) and eliminate. To reduce adult fly populations indoors, use a fogger (keep all doors and windows closed) or trap.</p> <p><u>Outdoors:</u> Find fly breeding site(s) and eliminate.</p>	RTU 1 gal spray	Enforcer Flea Spray for Homes	0.01% pyriproxyfen (Nylar); 0.25% permethrin
	Spot On	Advantage	9.1% imidacloprid
		Frontline	9.8% fipronil; 11.8% methoprene
	Fogger	Raid Fumigator (or equivalent fogger product)	12.6% permethrin
<p>Flies</p> <p><u>Indoors:</u> Find fly breeding site(s) and eliminate. To reduce adult fly populations indoors, use a fogger (keep all doors and windows closed) or trap.</p> <p><u>Outdoors:</u> Find fly breeding site(s) and eliminate.</p>	Traps	Rescue Fly Trap	None
		Victor Fly Catcher Ribbon	None
		Victor Indoor Fly Trap	None

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PEST	PRODUCT TYPE	PRODUCT NAME	% ACTIVE INGREDIENT	
<p>Multicolored Asian Lady Beetle</p> <p>First, before lady beetles begin to seek refuge indoors (October & November in Georgia), take action to (1) seal all cracks 1/8 wide or wider, and (2) apply a spray around all potential entry points; reapply treatment every 2 weeks through the end of November. It is often best to seek help and advice from a professional pest control operator experienced in lady beetle control. Contact should be made early enough (August-September) so that preventative measures are in place before the onset of beetle migration indoors.</p> <p>Second, if beetles get inside the best solution is to vacuum them; insecticide treatments indoors are not recommended.</p> <p>For more information: See publication, <i>Multicolored Asian Lady Beetle</i>, at http://ipm.osu.edu/lady/lady.htm</p>	Sprays	Any ready-to-use or concentrated liquid spray labeled for this pest(s).	Various	
	<p>Perimeter Pests: Boxelder Bugs, Centipedes, Crickets, Earwigs, Grasshoppers, Ground beetles, Millipedes, Pillbugs, Scorpions, Scuds, Sowbugs, Crawling Spiders, Springtails</p> <p><u>Indoors:</u> No treatment needed.</p> <p><u>Outdoors:</u> Apply granulars to soil/mulch where these pests live and breed. If granulars are ineffective, apply a complete perimeter spray, or spot-treat around windows, doors, and other potential entry points. Place glue boards along the wall-floor interface to trap these pests as they enter.</p> <p>TIP: Reduce moisture in areas where these pests live by directing water away from the house and by keeping mulch to a reasonable depth. See previous section on Moisture Management. Avoid excessive accumulations of leaf litter and all other forms of debris. Store firewood away from the house. Be sure that all exterior doors are equipped with operative doorsweeps.</p> <p>TIP: After applications of granulars, water thoroughly.</p>	Sprays	Any ready-to-use or concentrated liquid spray labeled for this pest(s).	Various
		Granular	Any granular product labeled for this pest(s).	Various
	Glue Board	Tomcat Household Pest Glue Board	None	
<p>Rats and Mice</p> <p><u>Indoor and/or Outdoor:</u> Bait trap with food that rats and mice like. If food baiting is ineffective, try placing a piece of cotton or several strips of yarn on the trap that these vertebrates will use to line their nest. Place snap traps out of reach of toddlers and young children to avoid injury to fingers.</p> <p>TIP: Place traps along routes that these pests use most.</p>	Snap & Live Traps	Victor Snap Traps for Mice and Rats	None	
		Tomcat Snap Traps for Mice and Rats	None	
		Victor Live Traps for Mice	None	
		Tomcat Live Traps for Mice	None	

HOUSEHOLD AND STRUCTURAL INSECT CONTROL (continued)

PEST	PRODUCT TYPE	PRODUCT NAME	% ACTIVE INGREDIENT
<p>Silverfish & Firebrats</p> <p><u>Indoors:</u> With a spray, spot-treat areas where these insects live.</p> <p><u>Outdoors:</u> No treatment needed.</p>	Sprays	Any ready-to-use or concentrated liquid spray labeled for this pest(s).	Various
<p>Spiders (Web-Building)</p> <p><u>Indoors:</u> Use a broom and remove spiders and cobwebs without pesticide use.</p> <p><u>Outdoors:</u> Spray areas where spiders live; spray spiders directly. Use long broom and remove spiders and cobwebs without pesticide use.</p> <p>NOTE: Brown recluse spiders do not build webs. Their occurrence in Georgia is limited and largely unknown. Control of brown recluse spiders should be conducted only by a licensed pest control firm. If an infestation is suspected, collect a spider and submit to a county extension agent for verification.</p>	Sprays	Any ready-to-use or concentrated liquid spray labeled for this pest(s).	Various
<p>Stored Product Pests</p> <p><u>Indoors:</u> Find spilled and/or infested food (cereal, bird food, etc.) and throw away; only rarely is pesticide use needed. Place traps in area(s) where moths are seen.</p> <p><u>Outdoors:</u> No treatment needed.</p>	Trap	Safer The Pantry Pest Trap (for stored product moths only)	None
<p>Subterranean Termites</p> <p>Seek help from a professional termite control company. Do not attempt to treat your own home for termites. The products and treatment equipment needed are not available to the novice.</p> <p>For more information: See publications, <i>Termite Control Services: Information for the Georgia Property Owner and Biology of Subterranean Termites in the Eastern United States</i>, at http://www.ent.uga.edu/pubs.htm</p>	Concentrate	<p>Phantom. See www.termidoronline.com for more information.</p> <p>Premise 75. See backed by bayer.com for more information.</p> <p>Termidor. See www.termidoronline.com for more information.</p>	<p>21.45% chlorfenapyr; 0.125% or 0.25% application rate.</p> <p>75% imidacloprid; 0.05 or 0.10% application rate.</p> <p>9.1% fipronil; 0.06% or 0.125% application rate.</p>
	Bait	<p>Advance. See www.advancetbs.com for more information.</p> <p>Exterra/Labyrinth. See www.ensystex.com for more information.</p> <p>Sentricon/Recruit. See www.sentricon.com for more information.</p> <p>HexPro/Shatter. See www.dowagro.com/hexpro for more information.</p>	<p>0.25% diflubenzuron</p> <p>0.25% diflubenzuron</p> <p>0.50% noviflumuron</p> <p>0.50% hexaflumuron</p>

HOUSEHOLD AND STRUCTURAL INSECT CONTROL (continued)

PEST	PRODUCT TYPE	PRODUCT NAME	% ACTIVE INGREDIENT
<p>Wasps, Hornets & Yellow Jackets</p> <p><u>Indoors and Outdoors:</u> Treat nest entrance with jet-stream aerosol spray; treat at night when insects are least active. If apprehensive, <i>please</i> seek help from a professional pest control company.</p> <p>In the case of yellow jackets, if the nest cannot be found, traps can be placed in areas where yellow jackets forage. It should be noted, however, that research has demonstrated that yellow jacket traps have little to no impact on population reduction.</p> <p>NOTE: A mistake during treatment can result in hospitalization or even death from excessive wasp stings.</p>	Jet Aerosol	Any jet-spray aerosol product that shoots 20-25 feet.	Various
	Trap	Rescue Yellow Jacket Trap Raid RTU Disposable Yellow Jacket Trap	None None
<p>Wood-Infesting Beetles</p> <p>Determine if infestation is active or not active. Control recommendations, if they are needed, are first dependent upon determining whether the infestation is even active and, if so, then upon a positive beetle identification, preferably from an entomologist. If treatment is deemed necessary, seek help from a professional termite control company.</p> <p>*Product available for sale and use only to licensed professionals trained in the use of gas fumigants.</p>	Wood Treatment (preventative)	Bora-Care. See www.nisuscorp.com for more information.	40% disodium octoborate tetrahydrate
	Fumigant* (remedial)	Vikane. See www.vikanegasfumigant.com for more information.	99.8% sulfuryl fluoride; For Old House Borers use 4X the drywood termite rate. For Powderpost Beetles and Death Watch Beetles use 10X the drywood termite rate.

HOUSEHOLD PESTICIDE DILUTION TABLE

Dan Suiter, Extension Entomologist

Pesticide Formulation	(Amount of Pesticide Formulation for One Gallon of Water) Percentage of Actual Chemical Wanted in Mixture								
	0.0313%	0.0625%	0.125%	0.25%	0.5%	1.0%	20%	3.0%	5.0%
15% WP	2 1/2 tsp.	5 tsp.	10 tsp.	7 Tbs.	1 cup	2 cups	4 cups	6 cups	10 cups
25% WP	1 1/2 tsp.	3 tsp.	6 tsp.	12 tsp.	8 Tbs.	1 cup	2 cups	3 cups	5 cups
40% WP	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	10 Tbs.	1 1/4 cups	2 cups	3 1/4 cups
50% WP	3/4 tsp.	1 1/2 tsp.	3 tsp.	6 tsp.	4 Tbs.	8 Tbs.	1 cup	1 1/2 cups	2 1/2 cups
75% WP	1/2 tsp.	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	10 Tbs.	1 cup	2 cups
Emulsifiable Concentrate (EC)*									
10% - 12% EC 1 lb. actual/gal.	2 tsp.	4 tsp.	8 tsp.	16 tsp.	10 Tbs.	2/3 pt.	1 1/3 pts.	1 qt.	3 1/4 pts.
15% - 20% EC 1.5 lbs. actual/gal.	1 1/2 tsp.	3 tsp.	6 tsp.	12 tsp.	7 1/4 Tbs.	1/2 pt.	1 pt.	1 1/2 pts.	2 1/2 pts.
25% EC 2 lbs. actual/gal.	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	10 Tbs.	2/3 pt.	1 pt.	1 3/4 pts.
33% - 35% EC 3 lbs. actual gal.	3/4 tsp.	1 1/2 tsp.	3 tsp.	6 tsp.	4 Tbs.	8 Tbs.	1/2 pt.	3/4 pt.	1 1/3 pts.
40% - 50% EC 4 lbs. actual/gal.	1/2 tsp.	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	10 Tbs.	1/2 pt.	4/5 pt.
57% EC 5 lbs. actual/gal.	7/16 tsp.	7/8 tsp.	1 3/4 tsp.	3 1/2 tsp.	7 tsp.	4 1/2 Tbs.	9 Tbs.	14 Tbs.	1 1/2 cups
60% - 65% EC 6 lbs. actual/gal.	3/8 tsp.	3/4 tsp.	1/2 Tbs.	1 Tbs.	2 Tbs.	4 Tbs.	8 Tbs.	12 Tbs.	1 1/2 cups
70% - 75% EC 8 lbs. actual/gal.	1/4 tsp.	1/2 tsp.	1 tsp.	2 tsp.	4 tsp.	8 tsp.	5 Tbs.	7 1/2 Tbs.	13 Tbs.

* Quantity based on a standard weight of 8.3 lbs. liquid per gallon.

MILLILITERS OF CONCENTRATE REQUIRED TO PREPARE 1-GALLON OF SPRAY USING VARIOUS PERCENT CONCENTRATES

The figures in the Table are in milliliters. To convert to fluid ounces divide by 30, to teaspoons divide by 5 or tablespoons divide by 15.

By Wt Lb AI* (%) Per Gal	Percent Concentrate Desired								
	1/4	1/2	3/4	1	2	3	4	5	6
10-12 = 1 lb.	78.9	157.8	236.7	315.6	631.1	946.7	1262.2	1577.8	1893.4
15-20 = 1 1/2	52.6	105.2	157.8	210.4	420.7	631.1	841.5	1051.9	1262.2
25 = 2 lb.	39.4	78.9	118.3	157.8	315.6	473.3	631.1	788.9	946.7
30-35 = 3 lb.	26.3	52.6	78.9	105.2	210.4	315.6	420.7	525.9	631.1
40-50 = 4 lb.	19.7	39.4	59.2	78.9	157.8	236.7	315.6	394.5	473.3
55-57 = 5 lb.	15.8	31.6	47.3	63.1	126.2	189.3	252.4	315.6	378.7
60-65 = 6 lb.	13.1	26.3	39.4	52.6	105.2	157.8	210.4	263.9	315.6
66-70 = 7 lb.	11.3	22.5	33.8	45.1	90.2	135.2	180.3	225.4	270.5
72-85 = 8 lb.	9.9	19.7	29.6	39.4	78.9	118.3	157.8	197.2	236.7